Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
Allocation of Spectrum in the 5 GHz	)	RM 8653
Band To Establish A Wireless Component	)	
of the National Information Infrastructure	)	

-- AND --

In the Matter of	)	
Petition for Rulemaking to Allocate	)	RM 8648
the 5.a-5.35 GHz Band and Adopt	)	
Service Rules for a Shared Unlicensed	)	
Personal Radio Network	)	

To: The Acting Secretary

COMMENTS OF METRICOM, INC.

Metricom, Inc. ("Metricom") supports the Petition For an "NII Band" Rulemaking filed by Apple Computer, Inc. (the "Petition") requesting a 300 MHz frequency allocation to create a new, unlicensed, wireless radio service in the 5 GHz band.[1/] Metricom is a member of the Part 15 Coalition which is also filing Comments in this proceeding. Metricom supports those Comments and provides the following supplemental information to the Commission.

STATEMENT OF INTEREST

1. Metricom is a young, rapidly growing, technologically innovative company based in the Silicon Valley. With encouragement from the Commission (contained in various Part 15 proceedings authorizing unlicensed data communications devices employing spread spectrum

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[1/] Only very limited comment is provided herein with relation to RM 8648, the "WINForum Petition." As discussed infra at ¶ 14, Metricom does *not* support the WINForum Petition as the technical standards proposed do not permit equitable entry and operations in the limited voice service proposed.

techniques), Metricom has been a pioneer in the development of spread spectrum systems, and it has invested significant sums of money, time and energy to successfully develop, manufacture and market its sophisticated systems. Metricom's frequency hopping, spread spectrum systems are at the leading edge of technology. Its latest wireless modems provide a gross over-the-air transmission rate of 100 kbps, making it the fastest wide area wireless data network currently available. Metricom's innovative mesh network architecture provides an unlicensed wireless network permitting cost-effective, intelligent and flexible local and wide area (regional) data communications.

2. Metricom's knowledge, experience and expertise in the technology and operation of unlicensed spread spectrum services has caused it to participate in Commission proceedings involving unlicensed operations, and to support the Petition's proposal that the FCC adopt a new Part 16 of its Rules to provide an exclusive spectrum allocation for unlicensed operations. Metricom is anxious to expand its service offerings and to adapt its technology to operations in other frequency bands which provide a friendlier environment and a greater possibility for growth and expansion than is currently possible in existing unlicensed bands.

UNLICENSED OPERATIONS

3. The Commission has unequivocally recognized the important contributions and operations offered and created by unlicensed operations under Part 15.[2/] In the Petition, many uses of unlicensed operations are described. The opportunity to make use of a reasonable amount of spectrum open to all users (provided they meet *minimal* technical standards and operational requirements) makes it possible to develop high-performance, large capacity, low-cost radio equipment that provides solutions to public and private organizations and to individuals. Present public benefits and service offerings are only the tip of the iceberg. Current constraints on unlicensed operations (e.g., interference criteria, bandwidth limitations and increasing spectrum congestion) will inhibit the development and proliferation of unlicensed services to the detriment of the American public.

4. Metricom's Part 15 wireless data communications systems have been developed for use in many areas that are of significant importance to the public interest. Metricom would like to provide a few brief examples of the distinct benefits that are being derived from its unlicensed wireless technology, each of which supports an area that is of vital interest to the

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[2/] The Commission has stated:

> We continue to recognize the important opportunities that unlicensed [operation] . . . offers for creation of new services and Technologies. The current Part 15 unlicensed operations have proven successful in bringing forth a wide variety of services and devices. Part 15 devices are now used to provide important services for businesses . . . and also health and safety functions . . .. We believe that a substantial allocation dedicated for unlicensed [operations] . . . will have the potential to foster development of an even greater number and range of new wireless services and devices.

See In the Matter of Amendment of the Commission's Rules to Establish New Personal Communications Services (Gen Docket No. 90-314) ¶ 87.

American public. The following examples illustrate what is possible when rules designed to provide license-free network operations, adequate spectrum, open entry and minimal technical and operational standards are effective. The services in the following examples could be in jeopardy because of the current congestion and limitations imposed upon Part 15; however, these services could be expanded significantly with an allocation of exclusive spectrum for unlicensed operations as proposed by Apple.

5. In the electric utility industry, examples of the benefits of current Metricom license-free network operations include less expensive electricity, reduced pollution, fuel conservation, and improved service to customers.[3/] In waste water management, Metricom networks permit more efficient handling of waste water through support of improved automation of valves and pumping stations which result in more effective management of waste water systems and improved environmental controls.

6. In health care, Metricom Part 15 radio networks are being used in hospital complexes and the surrounding medical communities to provide improved communications between doctors, hospitals, patients and pharmacies. Access to patient records, remote monitoring of patients and provision of "original" prescriptions to pharmacies, regardless of the

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[3/] As an example of the importance of these systems, it should be noted that one of Metricom's customers, Southern California Edison Co. ("SCE"), one of the largest electric utility companies in the nation, has, with the encouragement of the California Public Utilities Commission ("CPUC"), invested approximately $30 million to develop its Part 15 unlicensed data "NetComm System" to automate the distribution of electricity and meter reading functions. The CPUC believes that automation of these functions will save SCE's ratepayers more than $40 million annually through the implementation of energy efficiency and conservation programs. See Reply Comments of SCE, In the Matter of Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, PR Docket No. 93-61, filed July 29, 1993.

location of the doctor or the patient, are just some of the activities enabled by unlicensed Part 15 wireless data communications.

7. In the area of education at all levels, the ability of students, teachers and parents to communicate and to access school and public on-line resources and the Internet will be a critical part of education in the information age.[4/] Metricom's Part 15 radio networks are now operational and are being evaluated at several major universities for a variety of applications supporting students and faculty.

[4/] The Connectivity for Learning Coalition (the "Coalition," a coalition of approximately 20 prominent education and library organizations and individuals concerned with providing affordable and efficient connections to the NII for schools, libraries and other learning institutions) has stated that unlicensed wireless communications provides an affordable and reliable alternative for accomplishing the goal of connecting these institutions to the NII. See, generally, Coalition Petition for Reconsideration, filed April 24, 1995, in In the Matter of Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, PR Docket No. 93-61, where the Coalition stated: A major plank of the Clinton Administration's policy platform has been the promotion and development of the NII. The NII has been described as a "network of networks" that will eventually connect Americans in all walks of life, allowing them to use a vast array of communications technologies and services to improve the quality of life. The Vice President clearly articulated a vision of the NII in a speech in January of last year when he said:

> We cannot tolerate--nor in the long run can this nation afford-- a society in which some children become fully educated and others do not; in which some adults have access to training and lifetime education, and others do not. Nor can we permit geographic location to determine whether the information highway passes by your door.

The Vice President also has set a worthy goal of connecting every classroom, library, and hospital to the NII by the year 2000.

Under the Coalition's proposal, public schools and libraries will gain the benefit of wireless interconnection to the NII with the attendant reduction in costs associated with wireless, unlicensed devices. The Coalition estimates that it will cost as much $10 billion to wire every classroom in America. This is a staggering cost to the nation's educators, some of whom cannot afford even teachers' salaries and books much less hi-tech learning innovations like the NII. Wireless connection to the NII, on the other hand, is less expensive by an order of magnitude. By any standard, connecting every classroom in America to the NII is in the public interest.

8. In personal communications, Metricom's unlicensed, wireless MicroCellular Data Networks ("MCDN") provide a location independent communications medium for a wide variety of personal and business applications. Included among the applications enabled by the MCDN are tetherless connection to the Internet, on-line services, electronic bulletin boards, personal financial services and electronic shopping malls.

9. No other communication medium available today has the potential to provide the breadth of services described above with the cost/benefit ratio that can be achieved by unlicensed radio networks. To limit the availability and usefulness of these networks would be to seriously impact the public interest in a very wide variety of areas. The examples above are related only to Metricom Part 15 unlicensed radio networks. In combination with all of the other unlicensed products that are both available and being developed, with the assistance of the Commission in response to the Petition, unlicensed operations will be one of the most significant advances in the efficient use of spectrum and provision of useful equipment and services to the public that the United States has ever witnessed.

10. The Petition proposes the establishment of a new Part of the Rules which would allow unlicensed services to fully develop and flourish, free from the congestion, interference, bandwidth limitations, constraints and uncertainties -- including regulatory uncertainties -- imposed upon today's Part 15 unlicensed operations. Such a proposal will serve the public interest.

OTHER UNLICENSED ALLOCATIONS

11. While the Commission has attempted to make frequencies available for unlicensed data transmission, none of these attempts serve the unique service needs outlined in the Petition. Both Apple and the Part 15 Coalition explain the problems with current unlicensed allocations

and those problems will not be reiterated here. However, Metricom will further explain problems existing with the Unlicensed Data PCS allocation and the Above 40 GHz proposed allocation for unlicensed operations.

12. As Metricom stated in its December 8, 1993 Petition for Reconsideration (In the Matter of Amendment of the Commission's Rules to Establish New Personal Communications Services (Gen Docket No. 90-314)), the power limits and bandwidth requirements specified in the rules for the service severely limit its potential, relegating it to a mere indoor service. Metricom indicated that the power limits of 100 microwatts multiplied by the square root of the transmission bandwidth was overly restrictive, especially when coupled with the minimum bandwidth of 500 kHz. Given the power and spectrum limitations specified for asynchronous operations, Metricom indicated that building penetration would not be feasible and calculated that in an indoor environment, the range of a PCS data transmission could be expected to be approximately 11 meters.[5/] Obviously, these constraints, coupled with the fact that the Commission allocated only 10 MHz of spectrum for Data PCS operations, do not make possible the "any time, any place" unlicensed wireless data capability which could establish regional networks for data transmission and interconnection with the NII.

13. While the Commission is also attempting to make an allocation for unlicensed operations in the Above 40 GHz proceeding, as Metricom pointed out in its Comments in that proceeding, among other technological and equipment development obstacles, the specific band proposed for unlicensed operations provides the poorest propagation of all the spectrum being

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[5/] See Metricom Petition for Reconsideration at Appendix A. It should also be noted that the "etiquette" adopted does not permit spread spectrum operations. See Metricom Petition at pp.5-6.

allocated in the proceeding[6/] -- thereby making unlicensed services in that band much less desirable and unable to compete with other services.

MINIMUM TECHNICAL STANDARDS

14. In developing the new service envisioned by the Petition, the Commission must be extremely careful *not* to develop technical rules which would preclude or prioritize any technologies or services that are compatible with the use of the band. A level playing field must be adopted so that all services can operate in an equitable fashion. Only those technical provisions which are absolutely necessary to promote access and equitable sharing of the band should be adopted. Accordingly, Metricom does not support the WINForum Petition as it does not appear to favor technical rules that would foster equitable entry and operation of all types of services.[7/] In this era of rapidly developing and ever changing technology, it is critical that only minimal standards be adopted so that the best and most efficient technologies will be encouraged to develop, and older, less efficient technologies are not locked into place. It is the technology that should govern, not the Commission. Minimum technical standards will foster the efficient use of spectrum by encouraging numerous users to operate cooperatively in a competitive environment.

[6/] See Comments of Metricom, filed January 30, 1995, at pp.3-4.

[7/] See WINForum Petition at pp. 17-18 (proposing European HIPERLAN standards) and at pp. 19-20 (proposing spectrum sharing protocol which would prioritize different types of traffic).

CONCLUSION

WHEREFORE, the premises considered, Metricom, Inc. supports the NII Band Petition filed by Apple Computer, Inc. and urges the Commission to proceed expeditiously with the adoption of a Notice of Proposed Rulemaking in accordance with the Petition and the views expressed herein.

Respectfully submitted,

METRICOM, INC.

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